COMMONWEALTH OF AUSTRALIA

PATENT SPECIFICATION

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Drawing Attached.

COMPLETE SPECIFICATION.

"IMPROVEMENTS IN OR RELATING TO BEAMS FOR USE AS FLOOR CENTRES AND THE LIKE."

We, MILLS SCAFFOLD COMPANY LIMITED of Trussley Works, Hammersmith Grove, London, W. 6., England, a British Company, carrying on business as Engineers, hereby declare this invention and the manner in which it is to be performed to be fully described and ascertained in and by the following statement :-

This invention relates to beams for use as floor centres, shuttering supports and the like in concrete constructions and is mainly concerned with the provision of a generally improved beam of this nature which can readily be adapted to span any distance within a given range whilst being

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efficient in operation and relatively easy to erect, dismantle and maintain.

Accordingly the invention provides a beam for the purpose specified having a composite structure including telescoping outer and inner sections each of which has a platform top and a spaced lower boom bar or tube extending parallel to the platform and connected thereto by lattice or zig-zag side members, and releasable clamping means adapted to interact between telescoped parts of said sections to secure the latter together in a relative position which affords the required overall beam length.

In order that the invention may be clearly understood and readily carried into effect, two embodiments thereof will now be described in detail with reference to the accompanying drawings in which,

Figure 1 is a side elevational view showing a composite beam structure in accordance with the invention having an outer main section and two inner sections telescoping respectively in opposite ends of the main section,

Figure 2 is a plan view of the structure shown in Figure 1,

Figure 3 is an underneath plan, to an enlarged scale, of the main beam section shown in Figures 1 and 2,

Figure 4 is an end elevation of the main beam section shown in Figure 3,

Figure 5 is an underneath plan, to an enlarged scale, of one of the inner telescoping sections shown in Figures 1 and 2,

Figure 6 is an end elevation of the inner section shown in Figure 5,

Figure 7 is a side elevation, partially broken away, showing a modified composite beam structure having a main outer section and only one inner telescoping section, and

Figure 8 is an end view of the structure shown in Figure 7.

Throughout the drawings similar constructional parts are denoted by the same reference numerals.

Referring now to Figures 1 to 6, the composite beam structure illustrated therein is composed of three separate sections, namely an outer or main section 1 and two similar inner telescoping or slide sections 2. The main section 1 has an upper member consisting of an elongated flat top plate 3 which provides a platform top for the main member. The longitudinal marginal side edges of the top plate 3 are downturned to form side flanges 4 which extend perpendicular to the plane of the plate 3. One web 5 of an angle iron is secured along the inside face of each side flange 4, the other webs 5a of these irons then extending towards each other in a plane substantially parallel to the plate 3. A lower member in the form of an elongated boom bar or tube 6 is disposed parallel to and immediately below the central longitudinal axis of the plate 3. This boom bar or tube 6 is secured to the plate 3 by two zig-zag shaped tubes or bars 7 which

extend from one end of the plate 3 to the other. The bars or tubes 7 could alternatively be of lattice form and are located one on each side of the boom bar or tube 6 and disposed in planes which incline outwardly from the boom bar towards the respective side flanges 4 of the plate 3, the troughs of the waves formed by the zig zag bars or tubes 7 being welded to opposite sides of the bar or tube 6 and the crests of the waves formed by the zig-zag bars or tubes 7 being welded underneath the webs 5a of the respective angle irons. As additional reinforcement, each end of the boom bar is welded in the vee of a V-shaped stirrup rod 8 the free ends of which are again welded to the flanges 5a of the respective angle irons 5.

Formed through the boom bar or tube 6 are four diametrically extending holes, the axes of which lie perpendicular to the plate 3. These four holes are disposed one adjacent each end of the bar or tube 6, beside the respective stirrup rods 8, and one inset approximately one-third of the distance along the length of the bar from each end of the latter. Within each hole there is secured a tapped sleeve which is arranged to receive a headed bolt 9, the ends of these bolts 9 remote from the bolt heads and nearer the platform 3 each having attached thereto a shoe-like member 10. Each bolt 9 and shoe 10 constitutes a clamping means, the function of which will be described in more detail later in the specification.

The flange 5a of at least one of the aforementioned angle irons 5 is formed with two apertures positioned one slightly inset from each end. These apertures are each surrounded on one side by a nut welded concentrically to the flange and are arranged to receive a headed bolt 14a which projects upwardly from the flange 5a towards the top plate 3 and constitutes a stop for the adjacent inner sliding section as will also be later described.

The two inner telescoping or slide sections 2, which are entered into opposite ends of the main member 1, necessarily have smaller cross-sectional and longitudinal dimensions than the main member 1 but otherwise are of similar construction except for minor modifications. The inner sections 2 are substantially identical to each other so that only one such section need be referred to in detail. The top plate 3a of this inner section 2 is provided with shallow flanges 4a along each longitudinal side edge, and two angle irons having webs 5b, 5c are welded to the under surface of the plate 3a one along each longitudinal side edge of the latter. These angle irons 5b, 5c are disposed with their webs 5b, 5c inclined at approximately 45° with respect to the plane of the plate 3a, the edges of the remote flanges 5b of the angle irons projecting slightly beyond the flanged side edges of the plate 3a. This arrangement provides longitudinally extending troughs along each side edge of the plate 3a which greatly

facilitates welding operations. The boom bar or tube 6a of the inner section is again disposed parallel to and beneath the central longitudinal axis of the plate and is connected to the top plate 3a by two further zig-zag bars or tubes 7a. The troughs formed by these zig-zag bars or tubes 7a are again secured by welding to the boom bar or tube 6a, the waves in the bars or tubes 7a being located, as in the main member, in planes which incline outwardly from the boom bar or tube 6a towards the side edges of the top plate 3a. The crests of the waves are welded to the under face of the top plate 3a along the inside of the respective angle irons. As a further reinforcement, a V-shaped loop 8a is welded to the top of the boom bar or tube 6a at each end of the latter, the free ends of these loops 8a being in turn welded to the under surface of the plate 3a at opposite ends of the latter.

Welded transversely across the top of that end of the inner section which will constitute one end of the composite beam when the structure is assembled, is an angle iron 11 this angle iron 11 being disposed with one web forming an extension or lip on the top plate 3a for seating on the lip or edge of a supporting structure. Extending transversely across the under face of the inner section 2, at a location slightly inset from the lipped end, is a prop stand 12 secured by side braces 13 the upper ends of which are respectively welded one to each outer flange 5b of the top plate angle irons. The prop stand 12 has a downturned rim 12a at each end and is arranged to bear on a conventional prop for supporting one end of the composite beam in a horizontal position. In some cases it may be desired to provide each prop stand rim 12a with a downwardly directed arcuate seating for engaging a transverse scaffolding tube or the like.

For co-operation with the stop 14a on the main section 1, a small laterally projecting plate 14 is secured to the outer web 5b of the appropriate angle iron on the inner section top plate. The location of this plate 14 is rather less than half-way along the length of the inner section from the outer end thereof.

The composite beam as described is assembled by first loosening off the four clamping bolts 9 and withdrawing the stops 14a to a position in which they no longer project above the upper face of the associated angle iron flange 5a in the main section. The two inner sections 2 are then telescoped or slid into opposite ends of the main section 1 so that the lipped ends of these inner sections project from opposite ends of the main section. For the purpose of the telescoping or sliding movement, the inwardly projecting flanges 5a of the main section angle irons provide shelves or runways for the apices of the V-section angle irons of the inner sections the latter then acting as runners. When each inner section has been entered a sufficient distance into the main section to ensure that the boom bar or

tube 6a of an inner section is located above two clamp shoes 10 on the main section and the stop plate 14 is beyond the associated stop bolt 14a, the stop bolts 14a are screwed home in their nuts and, by abutting against the outwardly directed faces of the respective stop plates 14, limit the amount by which the inner sections 2 can be withdrawn from or telescoped out of the main section 1. The inner sections 2 are then finally adjusted to provide the required overall beam length and the clamp bolts 9 are tightened up so that the clamp shoes 10 press upwardly on the boom bars or tubes 6a of the respective inner sections and thereby press the top plates 3a of these inner sections firmly against the under face of the top plate 3 of the main or outer section. This has the effect of clamping the three sections rigidly together to provide a composite beam structure.

The modification shown in Figures 7 and 8 is very much the same as that shown in Figures 1 to 6 except that, in this case, only one inner or sliding section 2 is utilised in conjunction with the main or outer section 1. In view of this the end of the main or outer section 1 which is remote from the inner section 2 will constitute the end of the composite beam structure and is therefore provided with a transverse angle iron 11a for engaging the edge or lip of a supporting structure as in the previous example. Also a prop stand 12 is provided on the main outer member near the lipped end thereof for the purpose of engaging a conventional prop as in the previous embodiment.

It will be appreciated that the composite beam as described may be arranged to span two walls or any other supporting structure or framework and may alternatively or additionally be supported on scaffold props by means of the prop stands provided. Normally the composite beam will be supported horizontally and, with the aid of other similar parallely arranged beams, will carry shuttering for receiving concrete in the construction of floors, ceilings and the like. The shuttering may, however, in some cases be dispensed with and the beams spaced closely together in the formation of hollow tile and concrete floors. When used for these purposes, the composite beam will be found particularly easy to erect in view of the provision for simple length adjustment and will be equally easy to dismantle. For this latter purpose the clamps can be loosened off to allow the main section to drop slightly and to enable the shuttering to be withdrawn from the centre. Likewise the open construction of the beam makes it relatively simple to maintain.

It will be appreciated that the beams as described may have alternative uses other than as floor centres or shuttering supports and may in fact be employed in any capacity requiring such a beam.

Having now fully described and ascertained our said invention and the manner in which it is to be performed we declare that what we claim is:-

1. A beam for the purpose specified having a composite structure including telescoping outer and inner sections each of which has a platform top and a spaced lower boom bar or tube extending parallel to the platform and connected thereto by lattice or zig-zag side members, and releasable clamping means adapted to interact between telescoped parts of said sections to secure the latter together in a relative position which affords the required overall beam length.

2. A beam as claimed in claim 1 wherein the platform top of the outer or main beam section is constituted by an elongated flat plate having downturned side flanges, one web of an angle iron being secured along the inwardly directed face of each said flange so that the second webs of these angle irons provide runways extending along the length of the plate and spaced below the under surface thereof for the sliding reception of runners on the, or each, said inner section.

3. A beam as claimed in Claim 2 wherein the platform top of each inner section is constituted by an elongated flat plate having downturned side flanges, two angle irons, positioned with their webs at approximately 45^{o} to the plane of the plate, being secured one along each side edge of the under face of the plate so that the apices of said angle irons provide the aforesaid runners.

4. A beam as claimed in any of Claims 1 to 3 wherein the clamping means between the outer section and that part of an inner section telescoped therein is constituted by two clamping bolts threaded through the boom bar or tube of the main section from the bottom of the latter and carrying shoes at their upper ends which are adapted to bear upwardly against the boom bar or tube of the inner section, when the clamping bolts are tightened, so as to force the platform top of said inner section hard against the under surface of the platform top of the outer section.

5. A beam as claimed in any of Claims 1 to 4 wherein the amount by which a telescoped inner section can be withdrawn from the outer section to extend the beam is limited by co-operating stop means on the aforesaid sections.

6. A beam as claimed in any of Claims 1 to 5 comprising a main outer section and two telescoping inner sections engaged respectively in opposite ends of said outer section.

7. A beam as claimed in any of Claims 1 to 6 wherein each section end which constitutes an end of the composite beam structure is provided with a transverse angle iron one web of which forms a lip for resting upon the lip or edge of a supporting structure.

8. A beam as claimed in any of Claims 1 to 7 wherein a prop stand is secured to the appropriate section adjacent each end of the composite structure for resting on a conventional prop to support the beam.

9. The improved composite beam structure for use as a floor centre or shuttering support substantially as hereinbefore described and illustrated with reference to Figures 1 to 6 or 7 and 8 of the accompanying drawings.

Dated this 5th day of February, 1954.

MILLS SCAFFOLD COMPANY LIMITED.

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Fellows Institute of Patent Attorneys of Australia.

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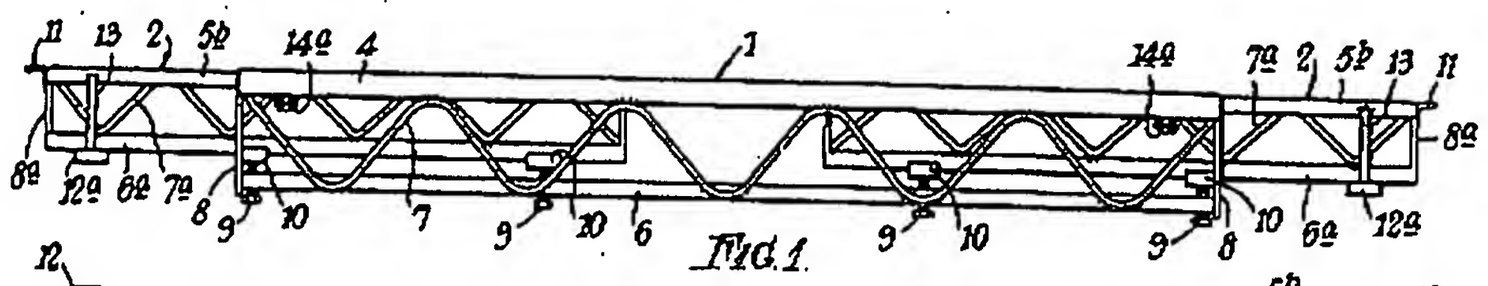

Fig. 1.

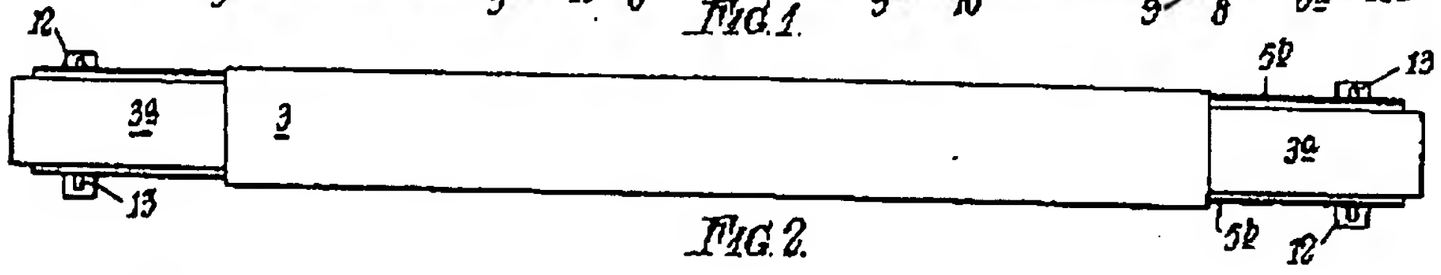

Fig. 2.

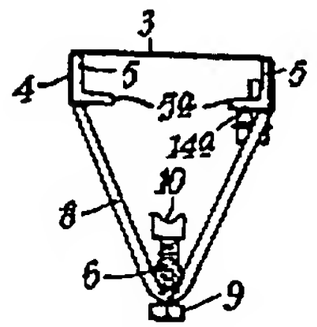

Fig. 4.

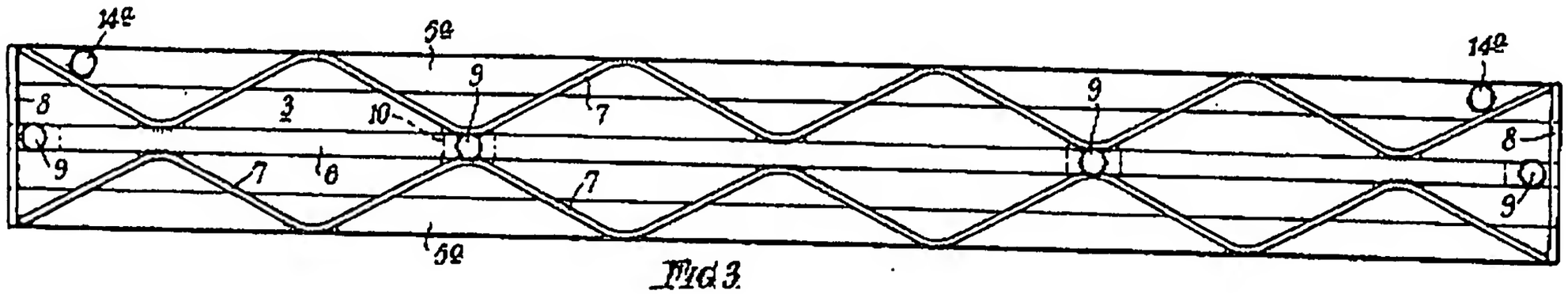

Fig. 3.

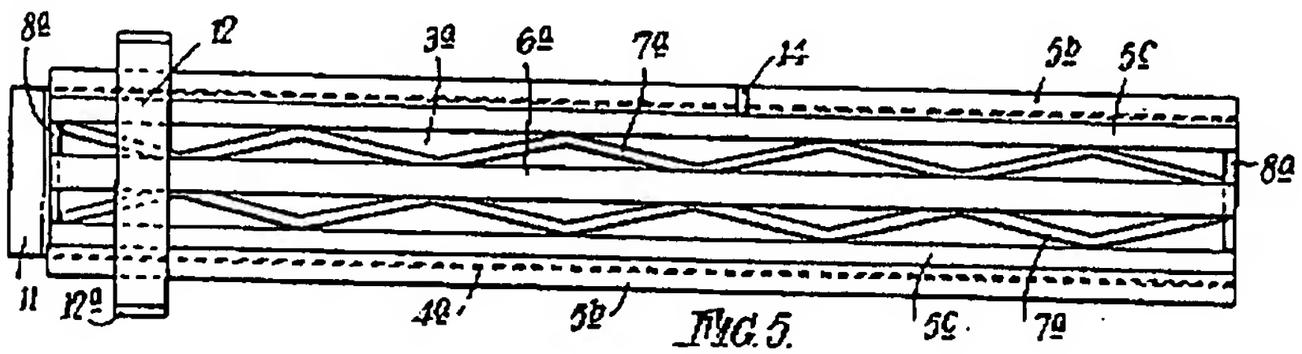

Fig. 5.

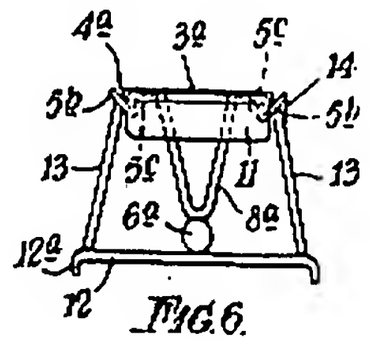

Fig. 6.

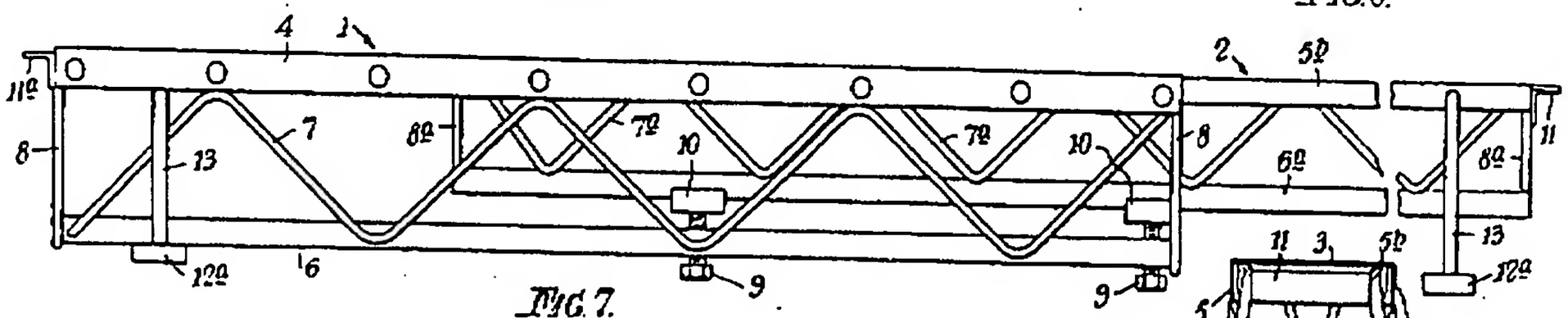

Fig. 7.

Fig. 8.